EXHIBIT DX4

TO DECLARATION OF PETER GOSS IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION TO EXCLUDE THE OPINIONS AND TESTIMONY OF

JOHN ABRAHAM, PH.D.

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

In Re: Bair Hugger Forced Air Warming Products Liability Litigation	)	
This Document Relates To:	)	
All Actions.	)	MDL No. 15-2666 (JNE/FLN)

VIDEOTAPED DEPOSITION OF SAID ELGHOBASHI
Newport Beach, California
Thursday, June 15, 2017

Reported by:
ELIZABETH BORRELLI, CSR No. 7844, CCRR, CLR
JOB NO. 124785

MS. ANDREWS: Yeah, the -- Counsel, let's just be clear. The new rules do not permit any -- and I believe that these are the rules that have been in play in this case with your witnesses and will be with your witnesses, that we are not -- and are not required to go into background conversations, drafts, communications with counsel are all off limits and I will be instructing him not to answer unless I hear a question that's properly posed to the witness.

BY MR. GORDON:

Q. I -- I'm not asking you if your -- if the attorneys you're -- you're working for typed up your -- your report. I'm assuming you didn't sit yourself at a -- at a keyboard and type up the report.

MS. ANDREWS: Objection. Argumentive. Calls for speculation.

Can you -- do you want that question back?

THE WITNESS: I would -- I would like to, yes.

MS. ANDREWS: Don't answer any question that you have not understood. And if I object or counsel has comments about the question, be sure and have it read back so it's clear in your mind before

you answer it.

THE WITNESS: I typed this report.

BY MR. GORDON:

Q. Okay. Did you have any graduate students assist you in any aspect of this report?

A. Yes.

Q. Who?

A. That would be Dr. Apte, A-P-T-E. He's a professor.

Q. Is he at Stanford?

A. He used to be at Stanford. He's now at Oregon State.

Q. Oregon State. Okay.

And what did Dr. Apte -- what were -- what was Dr. Apte's contribution to the -- to your report?

A. Running the computer program.

Q. The -- the code for the model?

A. Correct, yes.

Q. Okay. And, in fact, the -- the code that was used is proprietary code of Dr. Apte's, correct?

A. Correct.

MS. ANDREWS: Yeah.

BY MR. GORDON:

Q. So Dr. Apte actually ran the -- the

model --

A. Correct.

Q. -- correct?

Based on boundary conditions that you provided to him, right?

A. Correct.

Q. Okay. Did Dr. Apte participate in actually dev- -- developing the -- the boundary conditions?

A. No. I did.

Q. Okay. Was he physically present, you know, in Santa Monica when you went into that operating room?

A. No.

Q. Was he physically present for any aspect of this, or was this just something where he, up in Oregon, ran the -- ran the code?

A. So we met few times.

Q. Where?

A. At APS meet- -- American Physical Society meeting in Portland.

Q. Okay. When -- do you know when that was?

A. This was in November, before Thanksgiving.

Q. Now, did he charge for his work?

A. Correct.

Q. Did he bill the plaintiffs separately for that?

A. No. He -- only with me.

Q. Okay. And did -- did you then bill the plaintiffs' counsel for Dr. Apte's work?

A. Correct.

Q. Okay. Let's -- we -- we're jumping around a little bit because I'm just trying to put things together.

A. Yeah.

Q. 9C is the -- is the third invoice that was provided this morning. What -- and that -- I -- what -- what's the period of time that that covers?

A. February 17 to March 17.

Q. 2017, right?

A. Correct.

Q. Okay. So in those three invoices, 9A, 9B and 9C, I don't see any reference to a payment for Dr. Apte or any -- any other outside consultant. Did I -- did I miss it or would -- would there have been some other invoice?

A. Right. I -- I paid Dr. Apte. I paid him after I get the funds from the counsel.

Q. Okay. But in order to get the funds from

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MR. GORDON: I'm going to show you Exhibit 14.
(Whereupon Exhibit 14 was marked for identification.)
MR. GORDON: This is the copy of an expert report of Dr. Gary Settles. I assume I'm pronouncing that one correctly.
MS. ANDREWS: I think so.
BY MR. GORDON:
Q. Now, have you seen Exhibit 14 before today?
A. I have seen it, yes.
Q. Did you read it?
A. No.
Q. Did you read any of it?
A. Not really. I -- I've seen the pictures only.
Q. Okay. Did you look at the videos that are associated with --
A. No.
Q. -- the report?
A. No, no.
MR. ASSAAD: I would like to indicate to counsel that we have yet to receive the videos of -- underneath Settles' report, so that's a very

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misleading question.
MR. GORDON: Oh, I honestly didn't know that you hadn't. Is -- was there a technical glitch on that?
MR. ASSAAD: They didn't come. They didn't come with the --
MR. GORDON: Okay.
MS. ZIMMERMAN: It's not in the Dropbox. It's not electronically provided. We didn't get a hard copy of anything with a disk.
MR. GORDON: Oh. Well, I'll follow you on that, find out what the problem is.
Putting that aside.
THE WITNESS: Okay.
BY MR. GORDON:
Q. So have you -- and do you know Dr. Settles?
A. No.
Q. You ever heard of him?
A. No.
Q. Are you aware that Dr. Settles took certain measurements, actual measurements of temperature and airflow from the Bair Hugger?
A. I'm not aware. And I just, when I looked at this, I saw Schlieren pictures.

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[Reporter requests clarification.]
THE WITNESS: Schlieren, S-C-H-L-I-E-R-E-N. That's all.
BY MR. GORDON:
Q. And just flipping through that, you --
A. Yeah, that's all, yeah.
Q. Okay. So you have no idea whether the Schlieren images that Dr. Settles took, what they show?
A. No. No. Schlieren's visualization, it's not quantitative.
Q. Not quantitative?
A. Correct.
Q. And by quantitative, you mean something that actually measures in a -- in a particular unit of measurement, right?
A. Correct.
Q. Okay. Are you aware that Dr. Settles took measurements in addition to the Schlieren photography?
A. No.
Q. I guess not?
A. No.
Q. So as you sit here today, I take it you have no idea whether Dr. Kuehn's measurements or

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Dr. Settles' measurements either validate or refute the boundary condi- -- any of the boundary conditions that you used in your CFD?
A. No.
Q. And if they -- if the measurements differ from your boundary conditions by an order of magnitude, would that cause you to question the validity of your CFD?
A. Never.
MS. ANDREWS: Objection. Vague and ambiguous and improper hypothetical.
BY MR. GORDON:
Q. Okay. And that's because you --
MS. ANDREWS: The answer was?
MR. ASSAAD: Never.
MS. ANDREWS: Thank you.
THE WITNESS: Never.
BY MR. GORDON:
Q. And that's because you believe your CF- -- the CFD based on your boundary conditions based on your thinking is more accurate than measurements actually taken; is that right?
A. I repeat what I've said. My CFD is accurate if you have measurements in the same conditions I took, then it will be very accurate.

Q. As I understand it, you provided the boundary conditions to Dr. Apte?
A. Correct.
Q. And he, using his proprietary software, generated the CFD, right?
A. Correct.
Q. If those boundary conditions were not reflective of the real world, then the CFD may be accurate based on the boundary conditions that you provided, but it doesn't provide any insight into the real world, right?
A. Disagree.
Q. So even if the boundary conditions are significantly different than real world conditions, you believe the CFD is -- is an accurate depiction of the real world conditions?
A. The CFD produces accurate results for the boundary conditions installed in the code.
Q. Right. But if the boundary conditions are incorrect, the CFD is not going to be correct, right?
A. If the boundary conditions -- CFD results reflect boundary conditions. That's all. So --
Q. The boundary conditions that you --
A. Correct.

Q. -- gave Dr. Apte to put in, right?
A. Correct.
Q. And if the boundary conditions you gave Dr. Apte to put in are inaccurate, then the CFD is also inaccurate, right?
A. I do not give inaccurate boundary conditions.
Q. Okay. In Exhibit 9E, you list nine steps for which you charged $120,000, right?
A. Yes.
MS. ANDREWS: Hold on. What's going on? Hang on a second.
THE WITNESS: Yes.
MS. ANDREWS: Got it. I have it.
MR. GORDON: Keep that for a moment.
BY MR. GORDON:
Q. Is there anywhere in that list of nine steps where you include validation?
A. Validation is needed only if you have a new code you never used before, not validated.
Q. So once a code has been validated in one circumstance --
A. Yes.
Q. -- it's valid for any set of circumstances; is that your testimony?

A. If the code was tested for far more complex situation than the operating room, far more complex, then it will be accurate for a -- for a lower level computations.
(Whereupon Exhibit 15 was marked for identification.)
BY MR. GORDON:
Q. Let me show you Exhibit 15.
I'll represent to you that that's a series of screenshots, but from a -- from a much lengthier presentation on "Sudden Expansion - Verification & Validation."
You're familiar with this, aren't you?
MS. ANDREWS: He asked you if you're familiar with it.
THE WITNESS: Oh, you're asking me?
BY MR. GORDON:
Q. Yes.
A. I thought you were talking to yourself.
So which page? Or what -- what you want me to look?
Q. Well, Exhibit 15. You're -- you wrote it, right?
A. Did I write this?
Q. You don't recognize it?

MS. ANDREWS: You can take a few minutes to look at it.
THE WITNESS: I -- I -- oh, yeah, this is -- oh, it's good. This is the course I teach for undergraduates. Yeah, correct.
BY MR. GORDON:
Q. Yeah.
A. I didn't realize.
MS. ANDREWS: I know. Go ahead.
BY MR. GORDON:
Q. On the first page there it says authors Yong Wang and Said Elghobashi?
A. Well, I didn't read that. I'm sorry. I never thought this would be on the web. How did you -- okay. Good.
Q. Oh, it's --
MS. ANDREWS: Everything's on the internet, right?
MR. GORDON: The web is a mysterious place.
THE WITNESS: Yeah, this is an undergraduate course, yeah.
BY MR. GORDON:
Q. Okay. So this is what you use to teach undergraduates?

A. Absolutely.
Q. Okay. And could you read that first sentence under the -- that you wrote on the -- under the statement "Verification and Validation"?
A. "It is very important that you take the time to check the validity of sol- -- right, yes.
Q. Of your solutions?
A. Sure, yeah.
Q. And it -- the -- the words "very important" are --
A. Yeah. That's --
Q. -- are in bold face, right?
MS. ANDREWS: Wait, wait. You're doing it again. Let's just --
THE WITNESS: Okay.
MS. ANDREWS: Question, answer.
THE WITNESS: Okay. I'll wait for you.
MS. ANDREWS: If you need time to form -- if you need time to read something --
THE WITNESS: Okay.
MS. ANDREWS: -- or answer something better, just tell counsel.
THE WITNESS: Okay.
MS. ANDREWS: But don't talk at the same time.

THE WITNESS: Okay.
BY MR. GORDON:
Q. You -- so in -- in your teaching of -- of undergraduates --
A. Sure.
Q. -- in this material you say it is very important, and you emph- -- and bold faced very important --
A. Yes.
Q. -- that you take the time to check the validity --
A. Yes.
Q. -- of your solution.
What are you -- what are you telling your students when you -- when you say that?
A. What's written here.
Q. Okay. What did you do to validate the solution in the CFD that was created by Dr. Apte with your boundary conditions?
A. In the report that I submitted in March, it has maybe 15 papers to validate that code over 15 years.
Q. So is that -- was that what you tell your students, that -- that if the code they're using has already been validated by somebody else in some

other context, they don't -- that it isn't very important that they check the validity of their solution?
MS. ANDREWS: Argumentative.
You can answer.
THE WITNESS: So I don't know if you are aware, this is ANSYS, right? ANSYS is the black box code. So this statement is written because they are using a black box.
BY MR. GORDON:
Q. What do you mean by a black box?
A. They push buttons on it. They have no idea what's behind it. Okay? I never use ANSYS for research.
Q. Do you have access to Dr. Apte's code?
A. I have many codes.
Q. Do you have access to Dr. Apte's --
A. Yes.
Q. -- code?
A. Yes. Yes.
MS. ANDREWS: Wait, wait.
THE WITNESS: Yes. So you're asking about this, right? ANSYS is not for research. ANSYS is for teaching undergraduates.
BY MR. GORDON:

Q. Okay. So it's only undergraduates who have to -- in your view, have to validate their solutions?
A. No. I didn't say that.
Q. Okay. Help me out then.
A. This is written because they are using a black box, ANSYS Fluent.
[Reporter requests clarification.]
MR. ASSAAD: Fluent.
THE WITNESS: F-L-U-E-N-T.
BY MR. GORDON:
Q. Let me show you Exhibit 16.
(Whereupon Exhibit 16 was marked for identification.)
BY MR. GORDON:
Q. This is a paper that you co-authored on the "Numerical Solution of Laminar Flow Past a Sphere with Surface Mass Transfer."
A. Right.
[Reporter requests clarification.]
BY MR. GORDON:
Q. This is a paper you co- -- you co-authored on "Numerical Solution of Laminar Flow Past a Sphere with Surface Mass Transfer," correct?
A. Yes. Yes.

Q. In the -- the abstract or the summary at the top, the very last sentence is, "These predictions compare well with published experimental observations and other numerical results."

Do you see that?

A. Correct, yes.

Q. What -- what does that mean?

A. I think it's any code you use, you have to validate.

Q. So the code that you used in this hadn't been validated before?

A. This is an undergraduate student who never did -- so he wrote his own code under my supervision. And I'm telling him here, like I told the others, to validate, which we do all the time.

I didn't know you have access to this. This is amazing. Okay.

Q. So this code that's reflected in Exhibit 16 was validated by the experimental evidence?

A. Correct. As -- as written in the paper, yes.

Q. So now, for any future application forevermore, it's your view that this code would not need to be validated?

A. This is the laminar flow. I would say for a laminar flow, it will be fine for that student to do it, yes.

Q. Without any further validation?

A. We always validate codes always. This is undergraduate student wrote his code under my supervision, so I told him to do that. If my own code, which have been developing for 30 years, then I know exactly -- it's already validated for canonical flows and other things, then I know what is like. When you test an airplane, you test it for many years, then you give it to the pilot to take passengers. Codes are like that.

Q. Well, in fact, if you've got an airplane design that's been successful for many years and you change some small aspect of the design, there's always some validation that that design change is not going to impact its --

A. I'm aware.

Q. -- functionality, correct?

[Reporter requests clarification.]

MR. GORDON: Functionality.

THE WITNESS: I'm aware of.

BY MR. GORDON:

Q. So the fact that an airplane flies under

one set of conditions and under one particular design doesn't mean that modifying that design or modifying the conditions don't need to be checked out, right?

A. Correct. If a code was validated for all the ingredients, then it's valid. If you change the condition that the code will run for, you have to revalidate it again.

Q. Okay. And --

MS. ANDREWS: Counsel, excuse me. The charger. Sorry. Apologize. It's in their lobby, her charger.

MS. ZIMMERMAN: Should we take a break?

MS. ANDREWS: No, she's okay. I just want -- I just needed to tell somebody to go get it. I apologize.

MR. GORDON: Do you want to take your lunch break now? It's 2:30.

MS. ANDREWS: No, I think we're doing fine.

MR. GORDON: Okay.

MS. ANDREWS: We appreciate it.

BY MR. GORDON:

Q. Let me show you Exhibit 17.

(Whereupon Exhibit 17 was marked for

identification.)

MS. ANDREWS: Thank you. That's 16, the laminar flow.

MR. ASSAAD: We're at 17.

MS. ANDREWS: We're at 17 now.

MS. ZIMMERMAN: So.

MR. ASSAAD: Last one. My mistake.

MS. ANDREWS: That's okay. Looking in my stack of papers. Sorry.

BY MR. GORDON:

Q. This is the Saarinen paper that you cite in your expert report, isn't it?

MR. ASSAAD: Sorin? Oh.

MS. ANDREWS: Saarinen.

Okay.

BY MR. GORDON:

Q. Is it -- is this the paper that you --

A. Uh-huh.

Q. -- cite in your --

A. Correct.

Q. And let's -- let's talk about what you rely on this paper for, or cite it for. Turn to page 6 of your report, expert report, Exhibit 12.

A. What page?

MS. ANDREWS: Six.

THE WITNESS: Yes.
BY MR. GORDON:
Q. Okay. And the paragraph towards the bottom, I guess starting at line 123, "LES -- meaning large eddy simulation -- applied to operating rooms with medical staff and other instruments is still challenging, owing to the size of the room and the complexity of the geometries involved. At the time of the writing of this report, only one LES study has been performed for an operating room by Saarinen et al. (2015)."
Did I read that correctly?
A. Yes. Yes.
[Reporter requests clarification.]
THE WITNESS: Correct.
BY MR. GORDON:
Q. And that's Exhibit 16, right, or 17?
A. Yes.
MS. ANDREWS: 17.
MR. GORDON: 17.
THE WITNESS: Okay.
BY MR. GORDON:
Q. And you discuss the -- what the study does, and conclude that the Saarinen study, "Showed that LES can accurately predict such flows through

validation with experimental observations."
A. Correct.
Q. Why did you mention anything about the Saarinen paper?
A. It's here. It's written.
Q. No, I understand, but, I mean, you -- what -- what difference does it make that -- what the Sarimen -- Saarinen study did or didn't show?
A. I described here what Saarinen did. What -- what -- what do you want?
Q. Right, but you say it -- it showed that LES can accurately predict such flows through validation with experimental observations.
A. Okay.
Q. Your testimony is that LES is validated, and so you -- you don't -- it doesn't need any validation in --
A. Sir --
Q. -- other contexts, right?
A. Sir, let me explain to you. Code takes 15 to 20 years to develop. It's your code. You know everything about it. I cannot take a code from here (indicating) to say the -- what's quality. We just are referring that there are only one paper in the market for LES. That's all. I'm not saying --

I'm...
MS. ANDREWS: Did you finish your...
THE WITNESS: I'm just -- I do not understand your question. What do you -- what do you want to read this and say -- I -- I don't understand. Repeat it again.
BY MR. GORDON:
Q. Well, first of all, the -- the code that Dr. Apte uses, is that your code?
A. It is not my code, but I have access to it.
Q. Well, is that one you've helped develop?
A. No.
Q. So when you talk about code that you've developed over --
A. Right.
Q. -- many, many years, that -- that's --
A. A code.
Q. -- that -- that wasn't the one that was used?
A. I have other codes, yes.
Q. Okay. Why did you use Dr. Apte's code?
A. My codes are dealing something called DNS, direct numerical simulation.
[Reporter requests clarification.]

THE WITNESS: Numerical simulation.
BY MR. GORDON:
Q. So you've never developed a large eddy simulation code; is that correct?
A. DNS code is far more than LES code. It's different.
Q. Have you ever developed a large eddy simulation code?
A. DNS code is like an LES code. It's just you do some modification. It's the same thing.
Q. Why didn't you use DNS for the Bair Hugger situation?
A. I did not have enough students to run this, period.
Q. How many students were involved in running the Bair Hugger one?
A. Four or five.
Q. All in Oregon?
A. Correct.
Q. Getting back to Saarinen, what is it about Saarinen that you said that -- that it showed that LES could accurately predict such flows through validation with experimental observations?
A. As you read this paper, it -- it can confirm what I wrote here. It's a summary of that

clever in trying to say that what -- anything that isn't rocket science -- it's kind of a colloquial joke, you know, well, it ain't rocket science. I wasn't -- didn't mean you any disrespect, sir.

A. Okay. The same equations used for rocket science are identical equation used for operating room. Both same complexity, yes.

Q. So an operating room CFD would be as complex --

A. Correct.

Q. -- as rocket science?

A. Because the same equations are used. It's called Navier-Stokes equations.

[Reporter requests clarification.]

THE WITNESS: Navier-Stokes.

BY MR. GORDON:

Q. Isn't Navier-Stokes an equation essentially used in almost all fluid modeling?

A. Correct.

Q. So is there any simple system to which Navier-Stokes wouldn't apply?

A. Never. Fluid -- all fluid mechanics use Navier-Stokes equations.

Q. Okay. So is there something -- well, I'll let that pass.

A. I can -- rocket science, if there's rocket combustion, there would be additional equations that do not -- are not needed in the operating room, but Navier-Stokes would be the same in a rocket and operating room. Any complexity and rocket science would be additional equations: Chemical reaction, compressibility, mach numbers, things like that.

[Reporter requests clarification.]

THE WITNESS: Mach number, M-A-C-H number. Yeah.

BY MR. GORDON:

Q. Thank you.

If you'd turn to page 10 of your report, Exhibit 12.

A. Yes.

Q. In the Figure 3, you have a depiction --

A. Yes.

Q. -- of the BH blower --

A. Correct.

Q. -- in a box.

MS. ANDREWS: 10.

BY MR. GORDON:

Q. Is -- are those dimensions that are reflected on the drawing, are those intended to be the entire Bair Hugger?

A. Could you repeat again.

Q. Well, do you know how tall the Bair Hugger is?

A. Yeah.

Q. How tall is it?

A. I mean, the machine itself is here (indicating), like that height, and then a hose and then a blanket.

Q. So -- well --

A. Like this is a schematic. This is not real.

Q. No, I under- -- -- let me ask the question a different way. The scale that's drawn here would suggest that the height of this object that you've identified as the BH blower is about .7 meters, right?

A. Right, that's -- yeah, yeah.

Q. A little over, like --

[Reporter requests clarification.]

BY MR. GORDON:

Q. A little over two feet, 2.3 feet?

A. Uh-huh.

Q. Is that your understanding as to how tall the Bair Hugger is?

A. No, the Bair Hugger is lower than that.

Q. Do you know how much lower?

A. About 30 centimeters, so 30... foot something, around a foot and few inches.

Q. So which part of this drawing is the actual Bair Hugger unit?

A. Could be the lower part or something. It says "schematic," so it does not -- yeah.

Q. What -- well, who -- first of all, who created that schematic?

A. It's from the CAD that was created before -- before the team -- before the simulation, yeah.

Q. And who did the inputs to the computer to generate the CAD?

A. Okay. We had a CAD from -- we had the CAD from a company in Rochester for -- we added things to the CAD to allow for the Bair Hugger to be in. So we had a CAD before -- for a generic room, and we changed the dimensions to match 3M dimensions.

Q. Okay. What I'm just trying to understand is, is this depiction showing the Bair Hugger on the bottom with something else sitting on top of it --

A. Right.

Q. -- or the Bair Hugger on top sitting on something else?